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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,342	06/05/2006	Allan Mitchell	A-9955	2429

20741 7590 04/28/2010
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EXAMINER	
POLYANSKY, ALEXANDER	
ART UNIT	PAPER NUMBER
1793	

MAIL DATE	DELIVERY MODE
04/28/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,342	MITCHELL ET AL.	
	Examiner	Art Unit	
	ALEXANDER POLYANSKY	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 October 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-9 and 11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-9 and 11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1, 4-9, and 11 remain for examination, where claims 1, 4-7, and 11 have been amended.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 28, 2009 has been entered.

Drawings

Figure 2 is objected to under 37 CFR 1.83(b) because it is incomplete. 37 CFR 1.83(b) reads as follows:

Please pay close attention to the underlined portions of the rule!

> **When the invention consists of an improvement on an old machine the drawing must when possible exhibit, in one or more views, the improved portion itself, disconnected from the old structure, and also in another view, so much only of the old structure as will suffice to show the connection of the invention therewith.**

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation "wherein the semiconductive material" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. There is no mention of any semiconducting material in claims 1 or 5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4-9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stephenson US 6,866,835 in view of Schora et al., US 3,442,620.

Regarding claim 1, Stephenson teaches the non-electrolytic energy production by dissociating H_2O molecules at or near a reactive or catalytic surface (column 3, lines 11-67).

Stephenson teaches a first reactor with H_2O as the feed material (claims).

Further Stephenson teaches a reactor with the following structural features of lines 5-11, comprising (col. 5, lines 48-59)

an electronegative half cell reaction producing hydrogen;

a first electropositive half cell reaction having a sufficient potential to drive the electronegative half cell reaction; and

a second electropositive half cell reaction all occur;

wherein said first and second electropositive half cell reactions are selected in combination with said electronegative half cell reaction to produce hydrogen and/or energy production from the feed material.

Stephenson does not explicitly teach a second reactor as claimed in line 3, and including the step of introducing steam into the second reactor as claimed in claim 1 lines 13-17.

However, in a system similar to Stephenson, wherein production of hydrogen is taught, Schora teaches production of hydrogen via steam-iron process (title) in a non-electrolytic system in order to produce and deliver the steam necessary for the non-electrolytic process in the second reactor to maximize the efficiency of the energy output from the first reactor and input into the second reactor by promoting the self-activating reaction with the aid of steam.

It would have been obvious to a person of ordinary skill in the art to combine the reactor of Stephenson with the reactor of Schora to make two reactors in view of the teaching of Schora in order to make more hydrogen in the second reactor and further it would have been obvious to

modify the system of Stephenson with the catalytic reactor of Schora in order to produce and deliver the steam necessary for the non-electrolytic process in the second reactor to maximize the efficiency of the energy output from the first reactor and input into the second reactor by promoting the self-activating reaction with the aid of steam from the first reactor of Stephenson (Schora figs, tables, and etc.).

With respect to the amended feature in claim 1 line 15 "as the sole energy input to provide the necessary activation energy," Stephenson in view of Schora teaches feed steam at controlled temperature and pressure enters the reactor and exits as hydrogen and unreacted steam, which meets the amended feature of claim 1 line 15. Further with regard to the amended features of lines 13-17, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (see MPEP 2114) and even further, expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim (see MPEP 2115).

Regarding claim 4, Stephenson in view of Schora teaches the half cell reaction requires a catalytic surface (Schora title, abstract, etc.).

Regarding claim 5, Stephenson teaches instantly claimed oxidation of species selected from Groups I & II metals, binary and ternary hydrides, amphoteric elements, and etc. (column 4, lines 15-21 and claims 6, 7, 9, 10).

Regarding claim 6, Stephenson in view of Schora does not specify both reactors include the features as claimed in lines 2-4. However, because Stephenson teaches an electropositive half-cell reaction involving a metal organic complex as stated in the rejections of claims 1 and 4-

5, it would be obvious to one of ordinary skill in the art to duplicate the reactor of Stephenson in order to make more hydrogen as is already taught in Stephenson (Stephenson claims, etc.). See MPEP 2144.04(VI)(B).

With regard to the claimed limitations in lines 3-4, "capable of changing configuration to release... co-ordination number," while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (MPEP 2114) and even further, expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. See MPEP 2115. Therefore, selecting the half cells, providing a catalytic surface, and other such process limitations do not impart patentability because they are drawn to the use of the apparatus rather than to its' structure.

Regarding claims 7-8, Stephenson in view of Schora teaches oxidizing materials such as gallium thereby forming a semiconductive material (column 4, lines 15-21 and claims 6, 7, 9, 10, col. 8, line 14), which is a composite of gallium and oxide such as a Ga_2O_3, and which further meets the claimed feature of claim 8.

Regarding claim 9, Stephenson teaches an inbuilt heat exchange system (col. 7, lines 32-33). With regard to the claimed limitations of lines 2-3 "that can be used... exothermic chemical reaction(s)" while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (see MPEP 2114).

Regarding claim 11, Stephenson in view Schora teaches all the structural features as claimed in claims 1 and 4-9. With regard to the claimed limitation in lines 1-5 of claim 11, while

features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (see MPEP 2114).

Response to Arguments

Applicant's arguments filed February 25, 2009 have been fully considered, but they are not persuasive.

Arguments are as follows:

(I). Attorney submits that the present invention is not an improvement of a known machine or system, but is an entirely new improved reactor system including a first reactor system and a second reactor system. Consequently, since FIG. 2 depicts the system of the present invention, in its entirely. It would be improper to divide FIG. 2 into separate figures.

In response, the examiner's position regarding the drawings is as stated above. As per the 37 CFR 1.83(b), when the invention consists of an improvement on an old machine the drawing must when possible exhibit, in one or more views, the improved portion itself, disconnected from the old structure, and also in another view, so much only of the old structure as will suffice to show the connection of the invention therewith.

(II). Applicants submit that Stephenson is only concerned with a method for generating hydrogen and a single reaction system and, therefore, does not clearly disclose this feature (i.e. as the sole energy input of amended claim 1 line 15). The Examiner contends that Schora teaches the production of hydrogen via the steam-iron process, and "that it would have been obvious.., to combine the reactor in Stephenson with the reactor of Schora to make two reactors...". Although Schora is directed towards the production of hydrogen via a steam- iron process, there is no

disclosure of two complete reaction systems (or reactors) being connected together for enhanced results, or any reason for doing so. In contrast, the claimed invention, as recited in the amended claims, comprises two complete reaction systems, each reaction system including combining an electronegative half cell reaction with two electropositive half cell reactions to produce hydrogen and/or energy production from water. As the reactor in Schora does not have any of these features, we respectfully submit that even if a person skilled in the relevant technology had combined the reactor in Stephenson with Schora, he would not have arrived at the present invention.

In response, with regard to claim 1 line 15 "as the sole energy input" the examiner's position is as stated in the rejection above. Further, with regard to the amended feature of claim 1 line 15, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (see MPEP 2114) and even further, expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim (see MPEP 2115). Because the instant invention is drawn to an apparatus, structural features are met by the prior art of record as discussed above. All the other limitations pertain to functional language and material worked upon. As for the functional language, the prior art is structurally indistinguishable from the claimed apparatus and therefore reasonably taken to be capable of performing the claimed functions. As for the material worked upon, it and the manner by which the apparatus cooperates with it does not further limit the apparatus.

With regard to the assertion that the instant invention comprises two complete reaction systems as addressed by the Applicants in remarks page 6 fourth paragraph, the assertion is

based on the presumption that the protegy reactor of figure 2 is not known in the prior art. On the contrary, the protegy reactor of figure 2 is prior art (Stephenson) and should be labeled as such. In view of this, the instant invention only shows one complete reaction system, the enhanced reactor, which is also known in the prior art (Schora). Combining the two systems to make more hydrogen would be obvious to one of ordinary skill in the art as stated above. If the Applicants think that the two systems connected together do indeed show an enhanced result as stated in the remarks page 6 third paragraph, objective evidence which must be factually supported by an appropriate affidavit or declaration to be of probative value includes evidence of unexpected results, commercial success, solution of a long-felt need, inoperability of the prior art, invention before the date of the reference, and allegations that the author(s) of the prior art derived the disclosed subject matter from the applicant; and further, the arguments of counsel cannot take the place of evidence in the record. See MPEP 716.01(C)(I-II).

(III). Applicants submit that neither document recites, or even considers, the use of two reactor systems, there is also no disclosure, suggestion, or motivation to have steam produced as a by-product of a first reactor system, introduced at elevated temperature and a positive pressure, into a second reactor system, as the sole energy input to provide the necessary activation energy used by reaction systems in the second reactor system. The Examiner has argued that the applicants do not provide a single example of the invention apparatus or process. Attorney for applicant respectfully disagrees with the Examiner, as examples of the various features of a preferred embodiment of the claimed system are given in the summary of the invention, and also in the detailed description sections of the specification.

For example, the process of the reaction systems in a preferred embodiment is described in the detailed description where it states "In a preferred embodiment, the cell for carrying out the present invention is an alkaline cell, which uses an inert mesh cathode to provide electrons for the reduction of water according to the half cell equation...". Furthermore, suitable half cell reactions are provided, and the addition of steam in a second reaction system (referred to as an "enhanced reactor"), as well as details of the enhanced reactor, are also discussed. Attorney for applicant asserts that such disclosure is sufficient for a person skilled in the art to realize the claimed system.

In response, the examiner's position regarding the two reactors system and the amended feature of claim 1 line 15 is as stated above. Further with regard to instant arguments, as previously addressed in the office action dated April 28, 2009, the Applicants have failed to show that (i) part of figure 2 is prior art, (ii) there is not a single example of the invention apparatus or process to show that the process imparts patentability, (iii) the specification is not descriptive nor does it point out specifically what portions of the reactor or "reactors" the process is directed to, and (iv) the figures have no reference that would provide a description or a guided set of steps to compare with the specification in lieu of the examples.

Language that specifies various embodiments or preferred embodiments is not an example. An example would constitute one of those embodiments exemplifying an experiment with real data and tables and etc. In view of the lack of this data, one of ordinary skill in the art is not capable of ascertaining the enhanced results assertedly achieved from the combination of the reactors as stated in the Remarks page 6 third paragraph.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER POLYANSKY whose telephone number is (571)270-5904. The examiner can normally be reached on Monday-Friday, 8:00 a.m. EST - 5:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander Polyansky/
Examiner, Art Unit 1793

/Jessica L. Ward/
Supervisory Patent Examiner, Art Unit 1793